

**PATENT**

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**In the United States Patent and Trademark Office**  
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Applicant: E. Wies et al.

Applicant's Ref: IMM062C

Application No: Unassigned

Filed: March 5, 2002

Title: Defining Force Sensations Associated  
with Graphical Images (as amended)

Examiner: M. Geckil

Group Art Unit: 2756

**PRELIMINARY AMENDMENT**

Commissioner for Patents

Washington, D.C. 20231

Dear Sir:

Please amend the above-identified patent application as follows before the examination of the application:

In the Title:

Please delete the Title and replace with: -- Defining Force Sensations Associated with Graphical Images --.

**CLEAN VERSION OF AMENDMENTS**

**In the Specification:**

*Delete the paragraph starting on Page 1, line 16, and replace with:*

This is a continuation application of copending prior U.S. Application No. 09/649,723, filed August 28, 2000, which is a continuation of U.S. Application No. 09/244,622, now U.S. Patent No. 6,161,126, filed on February 2, 1999, which 1) is a continuation-in-part of copending U.S. Application

No. 08/691,852, now Patent No. 5,956,484, filed August 1, 1996, which is a continuation-in-part of U.S. Patent Application No. 08/571,606, now Patent No. 6,219,032, filed December 13, 1995; 2) is a continuation-in-part of Application No. 08/970,953, now Patent No. 6,300,936, filed November 14, 1997; and 3) claims priority to U.S. Provisional patent application no. 60/073,518, filed February 3, 1998; the disclosures of which are all incorporated herein by reference.

*Replace the paragraph starting on Page 12, line 19, with:*

The hardware architecture described above is also described in co-pending U.S. patent 5,739,811, filed 11/28/95, the disclosure of which is incorporated herein by reference. The high level command protocol between the computer and the force feedback device is also described in U.S. patent 5,734,373, filed 12/1/95, the disclosure of which is incorporated herein by reference. Force feedback as implemented in a graphical user interface is described in U.S. patent application no. 08/571,606, now Patent No. 6,219,032, filed Dec. 13, 1995, and incorporated herein by reference.

*Replace the paragraph starting on Page 15, line 10, with:*

Transducer system 150 also preferably includes actuators 154 to transmit forces to mouse 36 in space, i.e., in two (or more) degrees of freedom of the user object. The bottom housing plate 157 of actuator 154a is rigidly coupled to ground member 132 (or grounded surface 124) which includes, e.g. a magnet, and a moving portion of actuator 154a (e.g. a wire coil) is integrated into the base member 134. The actuator 154a transmits rotational forces to base member 134 about axis A. The housing 157 of the grounded portion of actuator 154b is coupled to ground member 132 or ground surface 124 through the grounded housing of actuator 154b, and a moving portion (e.g. a coil) of actuator 154b is integrated into base member 138. Actuator 154b transmits rotational forces to link member 138 about axis A. The combination of these rotational forces about axis A allows forces to be transmitted to mouse 36 in all directions in the planar workspace provided by linkage 130 through the rotational interaction of the members of linkage 130. The operation of the electromagnetic actuators 154 is described in greater detail in Patent Nos. 6,100,874 and 6,166,723. In other embodiments, other types of actuators, such as electrical DC motors, can be used. A different embodiment of a force feedback device can include flexure members to allow movement in provided degrees of freedom.

*Replace the paragraph starting on Page 18, line 5, with:*

Generic effects and authored effects are preferably composed from a basic set of stock force effects. The stock effects include vector forces, vibrations, springs, textures, and others, as described in Patent Nos. 5,825,308; 6,219,032; 5,959,613; 6,147,674; and 6,078,308, all incorporated by

reference herein. Effects of differing complexity can be provided as stock effects; for example, a primitive effect such as a simple vector force to be output in a specified direction at a specified magnitude can be provided, or a more complex effect that includes multiple primitive effects can be provided. One particularly significant, more complex effect is the enclosure. An enclosure is a set of forces that occur only when the cursor is in or near a geometrically bounded (“enclosed”) area of the screen. Enclosures can be associated with forces at their borders to attract the cursor to the inside of the bounded area, keep the cursor outside the bounded area, or attract the cursor to the border surrounding the bounded area. The enclosure may take a variety of shapes, for example rectangular or elliptical, and may also be associated with one or more other force effects when the cursor or pointer is positioned inside the enclosure. Examples of force effects that can be provided and programmed are specified in the FEELit Application Programming Interface (API) from Immersion Corporation of San Jose, CA., detailed in patent application no. 08/970,953, now Patent No. 6,300,936, filed 11/14/97, and incorporated by reference herein.

*Replace the paragraph starting on Page 45, line 34, with:*

FIGURES 19a, 19b, and 19c illustrate examples of force sensation design interfaces that can be displayed to edit the force effects for an object in the HTML editor. Alternatively, a separate force design application, such as I-Force Studio, can be run if the user wishes to modify or create a force effect. The shown interface windows are similar to the force sensation design tools provided in I-FORCE Studio® available from Immersion Corporation. These design tools provide a fully animated graphical environment for rapidly adjusting physical parameters of feel sensations, and then optionally saving them as “feel resources.” Authors may craft tactile feel sensations by stretching springs, manipulating surfaces, placing liquids, and adjusting other graphical representations and physical metaphors that represent each associated force feedback phenomenon. The design tools also empower end users with the ability to edit the “feel resource” using the same intuitive animated graphical controls used by the web page author. A user with no programming experience or familiarity with force feedback can quickly design high-fidelity, compelling sensations using these design tools. Such graphical manipulation for design of force effects is described in greater detail in U.S. Patents 6,147,674 and 6,169,540, both incorporated herein by reference.

#### In the Claims:

Claims which have been changed by this amendment are presented below and are labeled as “amended.” A marked up version of the amended claims follows the Remarks section.

Please cancel claims 1-56 without prejudice.

Please add the following claims:

57. (new) A method for defining force sensations for a haptic feedback interface device, the method comprising:

causing an image to be displayed on a display device, said display device coupled to a computer; and

receiving input from a user, said input providing a displayed graphical designation on said image, said displayed graphical designation spatially designating an area of said image, said area to be associated with at least one force effect selected by said user, said at least one selected force effect to be output as a force sensation by said haptic feedback interface device, said haptic feedback interface device including a user manipulatable object graspable and moveable by a user of said haptic feedback interface device.

58. (new) A method as recited in claim 57 wherein said at least one associated force effect is to be output when a user of said force feedback interface device moves a user-controlled cursor over a location on said image correlated with said area designated by said graphical designation.

59. (new) A method as recited in claim 57 wherein said image is an image of a web page object to be displayed on a web page downloaded over a network to a client machine, and wherein said haptic feedback interface device is in communication with said client machine.

60. (new) A method as recited in claim 59 wherein said at least one selected force effect is to be commanded by said client machine receiving said web page and to be output as said force sensation by said haptic feedback interface device.

61. (new) A method as recited in claim 59 wherein said area of said image is said entire web page object.

62. (new) A method as recited in claim 59 wherein said displayed graphical designation includes a graphical outline encompassing said area of said image.

63. (new) A method as recited in claim 62 wherein said area is a portion of said image, said portion not including an entire area of said image.

64. (new) A method as recited in claim 62 wherein said selected force effect associated with said graphical outline includes a texture effect, said texture effect to be output when a user-controlled cursor moves within an interior region of said outline.

65. (new) A method as recited in claim 62 wherein said displayed graphical designation includes a graphical line displayed on said area of said image, wherein said selected force effect associated with said graphical line includes a barrier force resisting motion of said interface device that causes said user-controlled cursor through said graphical line.

66. (new) A method as recited in claim 57 wherein said input from said user is input using a user interface tool that creates said graphical designation.

67. (new) A method as recited in claim 57 wherein said image is a two-dimensional pictorial image or text.

68. (new) A method as recited in claim 60 wherein said graphical designation is visually perceptible by said user providing said input and is visually invisible to a user of said haptic feedback interface device.

69. (new) A method as recited in claim 57 wherein said at least one selected force effect is output as a force sensation to said user of said client machine when said user moves a cursor over said graphical designation.

70. (new) An apparatus for defining force sensations for a haptic feedback interface device, the apparatus comprising:

means for causing an image to be displayed on a display device, said display device coupled to a computer;

means for receiving input from a user, said input providing a displayed graphical designation on said image, said displayed graphical designation spatially designating an area of said image; and

means for associating said area with at least one force effect selected by said user, said at least one selected force effect to be output as a force sensation by said haptic feedback interface device, said haptic feedback interface device including a user manipulatable object graspable and moveable by a user of said haptic feedback interface device.

71. (new) An apparatus as recited in claim 70 wherein said at least one associated force effect is to be output when a user of said force feedback interface device moves a user-controlled cursor over a location on said image correlated with said area designated by said graphical designation.

72. (new) An apparatus as recited in claim 70 wherein said apparatus is a client machine, and wherein said image is an image of a web page object to be displayed on a web page downloaded over a network from a server machine to said client machine, and wherein said haptic feedback interface device is in communication with said client machine.

73. (new) An apparatus as recited in claim 72 wherein said displayed graphical designation includes a graphical outline encompassing said area of said image.

74. (new) An apparatus as recited in claim 73 wherein said area is a portion of said image, said portion not including an entire area of said image.

75. (new) An apparatus as recited in claim 73 wherein said selected force effect associated with said graphical outline includes a texture effect, said texture effect to be output when a user-controlled cursor moves within an interior region of said outline.

76. (new) An apparatus as recited in claim 73 wherein said displayed graphical designation includes a graphical line displayed on said area of said image, wherein said selected force effect associated with said graphical line includes a barrier force resisting motion of said interface device that causes said user-controlled cursor through said graphical line.

77. (new) A computer readable medium including program instructions to be implemented on a computer, said program instructions performing steps comprising:

causing an image to be displayed on a display device, said display device coupled to a computer; and

receiving input from a user, said input providing a displayed graphical designation on said image, said displayed graphical designation spatially designating an area of said image, said area to be associated with at least one force effect selected by said user, said at least one selected force effect to be output as a force sensation by said haptic feedback interface device, said haptic feedback interface device including a user manipulatable object graspable and moveable by a user of said haptic feedback interface device.

78. (new) A computer readable medium as recited in claim 77 wherein said image is a web page object to be displayed in a web page, wherein said input from said user is received using a graphical tool implemented in a force-enabled web page authoring interface running on said computer.

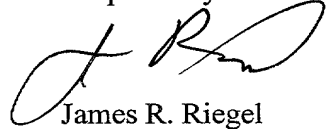
1000 999 998 997 996 995 994 993 992 991 990 989 988 987 986 985 984 983 982 981 980 979 978 977 976 975 974 973 972 971 970 969 968 967 966 965 964 963 962 961 960 959 958 957 956 955 954 953 952 951 950 949 948 947 946 945 944 943 942 941 940 939 938 937 936 935 934 933 932 931 930 929 928 927 926 925 924 923 922 921 920 919 918 917 916 915 914 913 912 911 910 909 908 907 906 905 904 903 902 901 900 899 898 897 896 895 894 893 892 891 890 889 888 887 886 885 884 883 882 881 880 879 878 877 876 875 874 873 872 871 870 869 868 867 866 865 864 863 862 861 860 859 858 857 856 855 854 853 852 851 850 849 848 847 846 845 844 843 842 841 840 839 838 837 836 835 834 833 832 831 830 829 828 827 826 825 824 823 822 821 820 819 818 817 816 815 814 813 812 811 810 809 808 807 806 805 804 803 802 801 800 799 798 797 796 795 794 793 792 791 790 789 788 787 786 785 784 783 782 781 780 779 778 777 776 775 774 773 772 771 770 769 768 767 766 765 764 763 762 761 760 759 758 757 756 755 754 753 752 751 750 749 748 747 746 745 744 743 742 741 740 739 738 737 736 735 734 733 732 731 730 729 728 727 726 725 724 723 722 721 720 719 718 717 716 715 714 713 712 711 710 709 708 707 706 705 704 703 702 701 700 699 698 697 696 695 694 693 692 691 690 689 688 687 686 685 684 683 682 681 680 679 678 677 676 675 674 673 672 671 670 669 668 667 666 665 664 663 662 661 660 659 658 657 656 655 654 653 652 651 650 649 648 647 646 645 644 643 642 641 640 639 638 637 636 635 634 633 632 631 630 629 628 627 626 625 624 623 622 621 620 619 618 617 616 615 614 613 612 611 610 609 608 607 606 605 604 603 602 601 600 599 598 597 596 595 594 593 592 591 590 589 588 587 586 585 584 583 582 581 580 579 578 577 576 575 574 573 572 571 570 569 568 567 566 565 564 563 562 561 560 559 558 557 556 555 554 553 552 551 550 549 548 547 546 545 544 543 542 541 540 539 538 537 536 535 534 533 532 531 530 529 528 527 526 525 524 523 522 521 520 519 518 517 516 515 514 513 512 511 510 509 508 507 506 505 504 503 502 501 500 499 498 497 496 495 494 493 492 491 490 489 488 487 486 485 484 483 482 481 480 479 478 477 476 475 474 473 472 471 470 469 468 467 466 465 464 463 462 461 460 459 458 457 456 455 454 453 452 451 450 449 448 447 446 445 444 443 442 441 440 439 438 437 436 435 434 433 432 431 430 429 428 427 426 425 424 423 422 421 420 419 418 417 416 415 414 413 412 411 410 409 408 407 406 405 404 403 402 401 400 399 398 397 396 395 394 393 392 391 390 389 388 387 386 385 384 383 382 381 380 379 378 377 376 375 374 373 372 371 370 369 368 367 366 365 364 363 362 361 360 359 358 357 356 355 354 353 352 351 350 349 348 347 346 345 344 343 342 341 340 339 338 337 336 335 334 333 332 331 330 329 328 327 326 325 324 323 322 321 320 319 318 317 316 315 314 313 312 311 310 309 308 307 306 305 304 303 302 301 300 299 298 297 296 295 294 293 292 291 290 289 288 287 286 285 284 283 282 281 280 279 278 277 276 275 274 273 272 271 270 269 268 267 266 265 264 263 262 261 260 259 258 257 256 255 254 253 252 251 250 249 248 247 246 245 244 243 242 241 240 239 238 237 236 235 234 233 232 231 230 229 228 227 226 225 224 223 222 221 220 219 218 217 216 215 214 213 212 211 210 209 208 207 206 205 204 203 202 201 200 199 198 197 196 195 194 193 192 191 190 189 188 187 186 185 184 183 182 181 180 179 178 177 176 175 174 173 172 171 170 169 168 167 166 165 164 163 162 161 160 159 158 157 156 155 154 153 152 151 150 149 148 147 146 145 144 143 142 141 140 139 138 137 136 135 134 133 132 131 130 129 128 127 126 125 124 123 122 121 120 119 118 117 116 115 114 113 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

## REMARKS

Claims 57-78 are pending in this application. Claims 1-56 have been cancelled and claims 57-78 have been added by this amendment. Applicant has amended the specification as indicated above to update application numbers with patent numbers. In addition, a copy of the Appendices provided on microfiche is submitted herewith.

Applicant respectfully requests a notice of allowance from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,



James R. Riegel  
Reg. 36,651

San Jose, CA  
408-467-1900



MARKED UP VERSION OF AMENDMENTS

In the Specification:

*Delete the paragraph starting on Page 1, line 16, and replace with:*

This is a continuation application of copending prior U.S. Application No. 09/649,723, filed August 28, 2000, which is a continuation of U.S. Application No. 09/244,622, now U.S. Patent No. 6,161,126, filed on February 2, 1999, which 1) is a continuation-in-part of copending U.S. Application No. 08/691,852, now Patent No. 5,956,484, filed August 1, 1996, which is a continuation-in-part of U.S. Patent Application No. 08/571,606, now Patent No. 6,219,032, filed December 13, 1995; 2) is a continuation-in-part of Application No. 08/970,953, now Patent No. 6,300,936, filed November 14, 1997; and 3) claims priority to U.S. Provisional patent application no. 60/073,518, filed February 3, 1998; the disclosures of which are all incorporated herein by reference.

[The present application claims the benefit of Provisional Patent Application serial. no. 60/073,518, filed February 3, 1998 by Wies et al., entitled, "Implementing Force Feedback Over a Computer Network"; and the present application is a continuation-in-part of U.S. Patent Application Serial No. 08/691,852, entitled "Method and Apparatus for Providing Force Feedback over a Computer Network," filed August 1, 1996 by Rosenberg et al., both of which are incorporated herein by reference for all purposes.]

*Replace the paragraph starting on Page 12, line 19, with:*

The hardware architecture described above is also described in co-pending U.S. patent 5,739,811, filed 11/28/95, the disclosure of which is incorporated herein by reference. The high level command protocol between the computer and the force feedback device is also described in U.S. patent 5,734,373, filed 12/1/95, the disclosure of which is incorporated herein by reference. Force feedback as implemented in a graphical user interface is described in U.S. patent application [serial] no. 08/571,606, now Patent No. 6,219,032, filed Dec. 13, 1995, and incorporated herein by reference.

*Replace the paragraph starting on Page 15, line 10, with:*

Transducer system 150 also preferably includes actuators 154 to transmit forces to mouse 36 in space, i.e., in two (or more) degrees of freedom of the user object. The bottom housing plate 157 of actuator 154a is rigidly coupled to ground member 132 (or grounded surface 124) which includes, e.g. a magnet, and a moving portion of actuator 154a (e.g. a wire coil) is integrated into the base member 134. The actuator 154a transmits rotational forces to base member 134 about axis A. The housing 157 of the grounded portion of actuator 154b is coupled to ground member 132 or ground surface 124 through the grounded housing of actuator 154b, and a moving portion (e.g. a coil) of actuator 154b is integrated into base member 138. Actuator 154b transmits rotational forces to link member 138 about axis A. The combination of these rotational forces about axis A allows forces to be transmitted to mouse 36 in all directions in the planar workspace provided by linkage 130 through the rotational interaction of the members of linkage 130. The operation of the electromagnetic actuators 154 is described in greater detail in [co-pending applications serial no. 08/881,691 and aforementioned 08/965,720] Patent Nos. 6,100,874 and 6,166,723. In other embodiments, other types of actuators, such as electrical DC motors, can be used. A different embodiment of a force feedback device can include flexure members to allow movement in provided degrees of freedom.

*Replace the paragraph starting on Page 18, line 5, with:*

Generic effects and authored effects are preferably composed from a basic set of stock force effects. The stock effects include vector forces, vibrations, springs, textures, and others, as described in Patent [No.] Nos. 5,825,308; 6,219,032; 5,959,613; 6,147,674; and 6,078,308, [and co-pending patent applications 08/571,606, 08/747,841, 08/846,011 and 08/879,296,] all incorporated by reference herein. Effects of differing complexity can be provided as stock effects; for example, a primitive effect such as a simple vector force to be output in a specified direction at a specified magnitude can be provided, or a more complex effect that includes multiple primitive effects can be provided. One particularly significant, more complex effect is the enclosure. An enclosure is a set of forces that occur only when the cursor is in or near a geometrically bounded ("enclosed") area of the screen. Enclosures can be associated with forces at their borders to attract the cursor to the inside of the bounded area, keep the cursor outside the bounded area, or attract the cursor to the border surrounding the bounded area. The enclosure may take a variety of shapes, for example rectangular or elliptical, and may also be associated with one or more other force effects when the cursor or pointer is positioned inside the enclosure. Examples of force effects that can be provided and programmed are specified in the FEELit Application Programming Interface (API) from Immersion Corporation of San Jose, CA., detailed in patent application [serial] no. 08/970,953, now Patent No. 6,300,936, filed 11/14/97, [Docket no. IMM1P035, entitled, "Force Feedback System Including Multi-Tasking Graphical Host Environment and Interface Device"] and incorporated by reference herein.

*Replace the paragraph starting on Page 45, line 34, with:*

FIGURES 19a, 19b, and 19c illustrate examples of force sensation design interfaces that can be displayed to edit the force effects for an object in the HTML editor. Alternatively, a separate force design application, such as I-Force Studio, can be run if the user wishes to modify or create a force effect. The shown interface windows are similar to the force sensation design tools provided in I-FORCE Studio® available from Immersion Corporation. These design tools provide a fully animated graphical environment for rapidly adjusting physical parameters of feel sensations, and then optionally saving them as “feel resources.” Authors may craft tactile feel sensations by stretching springs, manipulating surfaces, placing liquids, and adjusting other graphical representations and physical metaphors that represent each associated force feedback phenomenon. The design tools also empower end users with the ability to edit the “feel resource” using the same intuitive animated graphical controls used by the web page author. A user with no programming experience or familiarity with force feedback can quickly design high-fidelity, compelling sensations using these design tools. Such graphical manipulation for design of force effects is described in greater detail in [copending patent applications serial nos. 08/846,011, filed 4/25/97, and 08/877,114, filed 6/17/97,] U.S. Patents 6,147,674 and 6,169,540, both incorporated herein by reference.